

Such a condition of the American tamarack may never have been recorded. Mr. C. A. Weatherby of Gray Herbarium has written me that Penzig, in *Pflanzenateratologie*, ed. 2, iii. 497, states that this abnormality has been frequently observed on the European larch, but that Penzig gives no instance of its having been found on the American species.—GEORGE B. ROSSBACH, Poynette, Wisconsin.

A NOTE ON "FOSSIL EVIDENCE OF WIDER POST-
PLEISTOCENE RANGE FOR BUTTERNUT AND
HICKORY IN WISCONSIN"¹

STANLEY A. CAIN

THE thesis of this paper by Wilson and Webster² is that *Juglans cinerea* occurred in post-Pleistocene time about 50 miles east and *Carya cordiformis* about 90 miles north of their present limits in Wisconsin. The data presented to support this contention are as follows: *Juglans cinerea* was reported found in the peat of the 1.0, 1.5, 2.0, 3.5, and 4.0 foot levels, and was absent at the surface, 0.5, 2.5, 3.0, and 4.5 to 6.5 foot levels (the bottom); *Carya cordiformis* was reported found at the 1.0 to 5.0 foot levels, and was absent at all other levels. In all cases the frequency percentage of these species was 0.5 per cent, except for *Carya* at the 1.5 foot level where it composed 1.5 per cent of all grains counted.

The authors counted 200 grains from the peat at each level, in the range where *Carya* and *Juglans* occurred, which means that their conclusion that these species once grew near the bog is based on finding one grain of each species under consideration, with the exception noted above where three grains were encountered. Being aware of the possibility of criticism, they comment, "The fossil grains of these species are abundant in the peat even though they occur as a relatively small part of the total fossil count." Obviously, one must still depend upon percentages for purposes of comparison.

The crux of the matter is whether this small representation of pollen of *Juglans* and *Carya* is from trees that grew in the vicinity

¹ Contributions from The Botanical Laboratory, The University of Tennessee, n. ser. No. 60.

² L. R. Wilson and R. M. Webster. RHODORA 44: 409-414.

of the sedimentary basin, or whether it was blown in from perhaps as great a distance as now exists between the bog and the limits of the species. The authors rule out wind dissemination on the basis that these species are not represented in the surface layer. In this connection one might ask whether the apparent absence of *Juglans* from the 2.5 and 3.0 foot levels means that the species then retreated westward as it is supposed to have done since the time of the 1.0 foot level. They further reason that these species are probably under-represented in the peat because other deciduous species (*Acer*, *Tilia*, *Fraxinus*) growing in the vicinity today are not represented in the surface layer, whereas conifers are generally over-represented. Such relations do generally seem to prevail (especially the under-representation of insect pollinated species), but they do not constitute conclusive evidence that *Carya* and *Juglans* once grew near the bog.

In a recent study from our laboratory¹ of modern pollen rain in a spruce-fir forest in the Great Smoky Mountains, Gladys Carroll found *Picea* to be 15 per cent under-represented, and *Abies* 5 per cent and *Betula* 10 per cent over-represented, when compared with basal area percentages. Furthermore, pollen grains of several types were abundantly present although they had to be blown in from other climaxes than the spruce-fir. Their average percentages (over-representation) were: *Quercus* (9.4), *Pinus* (7.2), *Carya* (4.2), *Tsuga* (1.4), *Tilia* (trace), and *Liquidambar* (trace).

Henry P. Hansen² found pollen of fir species (*Abies nobilis*, *amabilis*, and *lasiocarpa*) in the peat of bogs on Orcas Island to the extent of a maximum of 16 per cent. Also, *Tsuga mertensiana* was sporadically represented. None of these is known from Orcas Island today, and Hansen says that although the species once may have grown on the Island their pollen grains also may have been blown from Vancouver Island or the Olympic Peninsula. This seems to me to be a reasonable stand, for the data are not conclusive, pro or contra.

Godwin³ cites instances of pollen grains being wind blown 30

¹ In a paper submitted to the Amer. Jour. Bot.

² "A pollen study of two bogs on Orcas Island, of the San Juan Islands, Washington," in press in Bull. Torrey Bot. Club.

³ "Pollen analysis. An outline of the problems and potentialities of the method." New Phytol. 33: 278-305.

to 300 kilometers, and Malmström¹ presents evidence for wind transport up to 1000 kilometers. Dyakowska² calculates average limits of dispersal of pollen in kilometers for the following genera: *Fagus* (28), *Quercus* (65), *Ulmus* (77), *Alnus* (132), and *Salix* (218).

Although the data on distance of dissemination are inadequate, very few authors would venture to consider small percentages of pollen to be significant with respect to past areal limits of a species unless regional surveys also indicate the boundary or a conspicuous composition trend exists through the profile.

This criticism of the paper by Wilson and Webster is offered because of the realization that the science of pollen analysis can add valuable information to the history of forest composition and areas providing, however, that the peculiar sources of error of the method are adequately considered and only justified claims are made.

THE UNIVERSITY OF TENNESSEE
Knoxville, Tenn.

THE PERENNIAL HELENIMUM OF THE EDWARDS PLATEAU OF TEXAS

V. L. CORY³

WITH one exception, so far as known to us, the Heleniums growing on the Edwards Plateau are annuals and bloom in the spring. On August 18, 1937, a tall-growing, perennial Helenium blooming in midsummer and later, was collected at the edge of running water in Turtle Creek in Kerr County, Texas. The friend with me was familiar with *H. autumnale* L. as it grows in Mississippi, and he asserted that it was not that species. However, a leading botanist to whom material was sent so determined the plant. In using the key for Helenium in North American Flora, Vol. 34, Part 2, while checking this determination it was noted that our plant might just as well have been referred to *H.*

¹ "Degerö Stormyr. Untersuchungen eines nordschwedischen Moorkomplexes." Mitt. Forst. Versuchs. Schwedens 20.

² "Researches on the rapidity of the falling down of pollen of some trees." Acad. Polonaise Sci. Internatl. Bul. Ser. B (I): 155-168.

³ Acting Chief, Division of Botany, Texas Agr. Expt. Station, A. & M. College of Texas, Sonora.